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journal, which is therefore to be regarded, not as an entirely new venture, but as a continuation of the series heretofore known as the Transactions of the Seismological Society. The new journal is issued in the same form and from the same printers as the old Transactions, and the first number, now at hand, bears on its title page Vol. XVII, which is its number in the old series, so that the new volumes can be bound uniformly with those previously issued. The annual subscription is five dollars.

In this number the first article is on 'The Mitigation of Earthquake Effects and Certain Experiments in Earth Physics' by Professor Milne, in which various lines of experiment are proposed that might possibly lead to the prediction of severe earthquakes so as to guard against their effects. In the second, 'On the Application of Photography to Seismology and Volcanic Phenomena,' Professor W. K. Burton describes with illustrations the photographic records from Milne's tremor indicators. In the third Professor Milne gives an abstract of the "Seismometrical Observations for the Year 1890," from which it appears that in that year 845 earthquakes were felt in Japan, of which 49 were classed as severe, 264 as moderate and 532 as feeble. Of the severe earthquakes, four (Jan. 7, Mar. 19, Apr. 16, Nov. 17) were accorded more detailed description. In the fourth article "On the Overturning and Fracturing of Brick and other Columns, by Horizontally Applied Motion," Professor Milne and F. Omori describe a very interesting series of experiments, wherein various objects such as blocks of wood of different dimensions, bricks, columns built of brick or of cement, were mounted on a wheeled truck to which a reciprocating horizontal motion could be communicated, and the circumstances of the motion, with the overturning or fracture of the object, were electrically recorded. From the data the maximum velocity and maximum acceleration necessary for overturning were calculated and compared with the experimental results with a fairly good agreement. In an article on "Earth Pulsations in Regard to Certain Natural Phenomena and Physical Investigations," Professor Milne concludes that "the movements called earth tremors are move-

ments in the crust of the earth not altogether unlike the swell upon the ocean," and infers a connection between them and the steepness of the barometric gradient. In an article "On the Movements of Horizontal Pendulums," he gives an abstract with notes of certain observations made by Dr. E. von Rebeur-Paschwitz at Potsdam, Wilhelmshaven and Teneriffe, and published in the *Astronomische Nachrichten*. F. Omori gives "A Note on Old Chinese Earthquakes," and as the concluding article Professor Milne gives a twenty-page "Note on the Great Earthquake of October 28, 1891," the phenomena of which are further discussed in his report to the British Association, 1892, and the complete account of which is to be issued under the auspices of the Imperial University of Japan, but is not yet ready for publication. According to the statements of this account the killed numbered 9,960, wounded 19,994, and houses totally destroyed 128,750. The immediate cause of the disaster was the formation of a fault which can be traced on the surface of the earth for a distance of between forty and fifty miles, and shows a difference of level amounting in many places to twenty or thirty feet. There is also abundant evidence of horizontal displacements, sometimes as great as eighteen feet, and the whole Neo Valley appears to have suffered a permanent compression, becoming narrower, the piers of bridges being left closer together than before the earthquake. There were also many observations of surface waves in the earth, involving a perceptible tilting of objects resting upon it; and the maximum horizontal motion indicated by the instruments was from 25 mm. to 35 mm. with a period of from 1 to 2.5 seconds.

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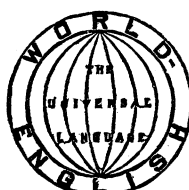
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to plant life. Methods of chemical analysis are wisely left for a separate work and the results of analysis alone are given when a knowledge of the same is necessary to an understanding of the discussion. The nature of the experiments, however, and the manipulation of the same, are given with sufficient fullness to enable the reader to judge of the value of the conclusions. The general arrangement of the book is as follows: Part I. treats of the nutrition of plants, of germination, and of the origin of the organic and inorganic constituents. Part II. makes a study of the atmosphere in its relation to plant life and of the gases influencing this life, of nitrogen, oxygen, carbonic acid, nitric acid, ammonia, etc. Part III. treats of soils, their formation and composition, and of their physical and chemical properties. A bibliography, coinciding with the arrangement of the text, completes the work.

The author is particularly interesting in his section on nitrification and also in treating of the assimilation of free atmospheric nitrogen by plants and soils. The experiments and conclusions of Berthelot and André are noted as well as those of M. Schloesing, the author concluding with; "Il n'entre pas dans notre programme d'insister davantage sur ces diverses recherches; car nous tentons d'ordinaire à n'avancer que des faits positifs. Ici il ne nous est guère permis de faire un choix entre les opinions produites. Il est à espérer qu'un prochain avenir levera les doutes qui règnent encore sur ce grave sujet."

The book has the usual exquisite neatness of first-class French publications, with full-bodied paper, clear print and broad margins, making it altogether a most enjoyable volume.

CHARLES PLATT.

Outlines of Forestry, or the Elementary Principles Underlying the Science of Forestry. By EDWIN J. HOUSTON. Philadelphia, J. B. Lippincott Co. 254 p. 12°. \$1.

This little book is a useful manual of facts relating to the subject. Among the matters considered are the conditions necessary for the growth of plants, distribution over the earth, forma-

tion of soil, animate and inanimate enemies of the forest, vapor, rain, drainage, climate, hail, reforestation and tree planting, etc. The last chapter, called "Primer of primers," contains in short, concise sentences the substance of what had been given at length in the earlier chapters. Taken by itself, it would serve a useful purpose in the education of the general public to the importance of the subject.

The book is, perhaps, unfortunately written in a loose and rather slovenly manner. It abounds in repetitions of not only the same ideas, but also of nearly identical words. The following extracts are particularly bad examples, but they fairly represent the ordinary style of the writer: "Heat and light are to be found in practically all parts of the earth. They differ, however, in amount in different regions of the earth, and such differences cause the differences that are noticed in the plants that grow in different regions." "The quantity of moisture in the air differs greatly in different parts of the earth, and on this difference, together with the difference in temperature, depends the differences observed in the plants of various regions." "Each section of the country possesses, so to speak, a nationality in its plants, or, in other words, there lives in each section of country a particular nation of plants. Such a nation of plants, or the plants peculiar to a particular section of country, is called its flora."

The author makes use of a new word, "heatshine," which is rather difficult to define. "The sunshine and the heatshine which awaken the sleeping germ and call it into activity," etc. In the appendix are given various lists of trees suitable for planting, and these contain some curious errors. For example, under the head of "deciduous trees" we find maples, hickories, cedars, firs and pines, while under "evergreens" are placed spruce, larch, sweet gum, poplar, oak, walnut, etc. In another place we observe under "conifers" bald cypress, red cedar, white pine, black cherry and European alder, while the European larch figures in another table as an evergreen. Errors of this kind rather detract from the value of the book.

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